

WHAT IS CLAIMED IS:

1. A photoelectric leak current compensating circuit for compensating for a photoelectric leak current generated in a Darlington circuit, which is provided in an integrated circuit, including a first PNP transistor and a second NPN transistor whose collector is connected to a base of the first PNP transistor, the photoelectric leak current compensating circuit comprising:

a Darlington circuit, including:

a third PNP transistor, whose emitter is connected to a collector of the first PNP transistor and whose collector is grounded, for compensating for the photoelectric leak current by absorbing a collector current of the first PNP transistor; and

a diode-structured fourth NPN transistor whose collector is connected to a base of the third PNP transistor and whose base and emitter are connected to each other.

2. The photoelectric leak current compensating circuit as set forth in claim 1, wherein:

$$S_1 \leq S_3, \text{ and } S_2 \leq S_4$$

where  $S_1$  and  $S_2$  are areas of N-type epitaxial layers of the first PNP transistor and the second NPN transistor, respectively, and  $S_3$  and  $S_4$  are areas of N-type epitaxial layers of the third PNP transistor and the fourth NPN transistor, respectively.

3. A photoelectric leak current compensating circuit as set

forth in claim 2, further comprising:

a fifth NPN transistor whose base receives the collector current of the first PNP transistor.

4. The photoelectric leak current compensating circuit as set forth in claim 1, wherein:

the collector of the first PNP transistor is grounded via a constant current source; and

a sum of (i) a constant current of the constant current source and (ii) the collector current, which is absorbed by the third PNP transistor, of the first PNP transistor is larger than the photoelectric leak current.

5. The photoelectric leak current compensating circuit as set forth in claim 1, wherein:

the transistors are laterally structured.

6. An optical signal circuit comprising a photoelectric leak current compensating circuit for compensating for a photoelectric leak current generated in a Darlington circuit, which is provided in an integrated circuit, including a first PNP transistor and a second NPN transistor whose collector is connected to a base of the first PNP transistor,

the photoelectric leak current compensating circuit including:  
a Darlington circuit, including:

a third PNP transistor, whose emitter is connected to a collector of the first PNP transistor and whose collector is grounded, for compensating for the photoelectric leak current by absorbing a collector current of the first PNP transistor; and

a diode-structured fourth NPN transistor whose collector is connected to a base of the third PNP transistor and whose base and emitter are connected to each other.